



TRANSMAP

**An Integrated, Real Time Environmental Monitoring and
Forecasting System for Highways & Waterways in
Rhode Island**

**TRANSMAP
(Transportation
Mapping and
Analysis
Program)
development is
sponsored by
the University
of Rhode
Island
Transportation
Center**

**Malcolm L. Spaulding
University of Rhode Island
Ocean Engineering
Narragansett, RI**

**Thomas B. Opishinski
Interactive Oceanographics
East Greenwich, RI**

**Marine Transportation System R & T Coordination Conference
National Academy of Sciences
Washington, DC
November 2001**



TRANSMAP

PROJECT OVERVIEW

TRANSMAP
supports
applications
to land and
Marine
transportation
systems.

- TRANSMAP IS AN INTEGRATED REAL TIME MONITORING AND MODELING SYSTEM THAT PROVIDES ENVIRONMENTAL AND PAVEMENT CONDITIONS FOR HIGHWAYS AND WATERWAYS IN RHODE ISLAND.
- TRANSMAP IS THE EVOLUTION AND INTEGRATION OF TWO SYSTEMS:
 - ➔ ROADMAP: HIGHWAY WEATHER MONITORING SYSTEM FOR NEW JERSEY DOT, ROUTE 80.



TRANSMAP

PROJECT OVERVIEW

Environmental data is critical for effective operation, management, and evaluation of various land and marine transportation systems.

→ **COASTMAP: MARINE ENVIRONMENTAL MONITORING, MODELING AND MANAGEMENT SYSTEM. APPLICATIONS INCLUDE:**

- ◆ **EAST & WEST COAST OF MEXICO - REAL TIME MONITORING OF SEA SURFACE ELEVATION/30 STATIONS WITH TIDAL FORECASTS**
- ◆ **REAL TIME WATER QUALITY MONITORING FOR ESTUARINE RESERVE IN ROOKERY BAY, NAPLES, FLORIDA.**



TRANSMAP

PROJECT OVERVIEW

Environmental data is critical for effective operation, management, and evaluation of various land and marine transportation systems.

- ◆ **REAL TIME WATER QUALITY MONITORING OF SELECTED BELIZE ISLANDS, SMITHSONIAN INSTITUTION.**
- ◆ **WATER QUALITY MONITORING FOR SAVANNAH RIVER ESTUARY (30 STATIONS, SEVERAL REAL TIME), GEORGIA PORTS AUTHORITY.**
- ◆ **REAL TIME MONITORING, MODELING (HINDCAST, NOWCAST AND FORECAST) IN GREENWICH BAY, RHODE ISLAND.**



TRANSMAP

PROJECT OBJECTIVES

Broad goal is to develop a fully integrated real time monitoring and modeling system to provide environmental and pavement condition for highways and waterways.

- **DEVELOP AN INTEGRATED SYSTEM FOR MONITORING AND FORECASTING OF ENVIRONMENTAL CONDITIONS IN SUPPORT OF RI DEPARTMENT OF TRANSPORTATION AND THE RI TRANSPORTATION COMMUNITY.**
- **IMPLEMENT, TEST AND EVALUATE THE SYSTEM IN RI AND ADJACENT COASTAL WATERS.**

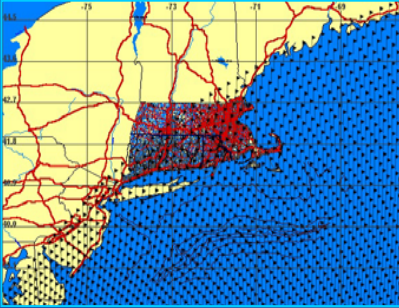


TRANSMAP

PROJECT OBJECTIVES

Broad goal is to develop a fully integrated real time monitoring and modeling system to provide environmental and pavement condition for highways and waterways.

- **TRANSFER THE DATA PRODUCTS AND FORECASTS TO INTERESTED RI DOT OPERATIONS STAFF, MAJOR TRANSPORTATION USER GROUPS (FERRY AND MARINE TRANSPORTATION) AND THE PUBLIC.**
- **TRANSFER THE SYSTEM FOR COMMERCIALIZATION BY PRIVATE INDUSTRY.**



TRANSMAP

CONCEPTUAL FRAMEWORK

TRANSMAP (Professional) is a Windows based system providing access to data and model products through an interactive geographic information system.

➤ TRANSMAP FEATURES:

- OPEN ARCHITECTURE
- EMBEDDED GEOGRAPHIC INFORMATION SYSTEM
- INDUSTRY STANDARD SOFTWARE TOOLS
- STANDARDIZED DATA HANDLING PROTOCOLS
- ENVIRONMENTAL DATA ANALYSIS AND PRESENTATION SYSTEM
- ENVIRONMENTAL PROCESS MODELS WITH DATA ASSIMILATION



TRANSMAP

CONCEPTUAL FRAMEWORK

TRANSMAP
Map-Data-
Web server
supports
public access
to data and
model
products via
the Internet
through an
interactive
web site.

➤ SCALABLE INTERNET MAP/DATA/WEB SERVER FEATURES:

- **AUTOMATED REAL TIME RETRIEVAL,
ARCHIVING AND MANAGEMENT OF
ENVIRONMENTAL DATA**
- **INTERNET DATA DISTRIBUTION SYSTEM
SUPPORTING PUBLIC ACCESS TO REAL
TIME AND HISTORICAL DATA, MODEL
FORECASTS, PROJECT INFORMATION
AND AN INTERACTIVE GEOGRAPHIC
INFORMATION SYSTEM VIA WEB SITE
(<http://transmap.oce.uri.edu>)**



TRANSMAP/web

[Home](#)[Background](#)[Data](#)[Models](#)[Related Sites](#)

TRANSMAP/web provides access to real-time and archived environmental data collected by sensors throughout Rhode Island and Narragansett Bay.

TRANSMAP/web is part of a larger project funded by the University of Rhode Island Transportation Center to collect environmental data important to the transportation industry in Rhode Island.

TODAY'S INFO

Get the latest info on today's water conditions

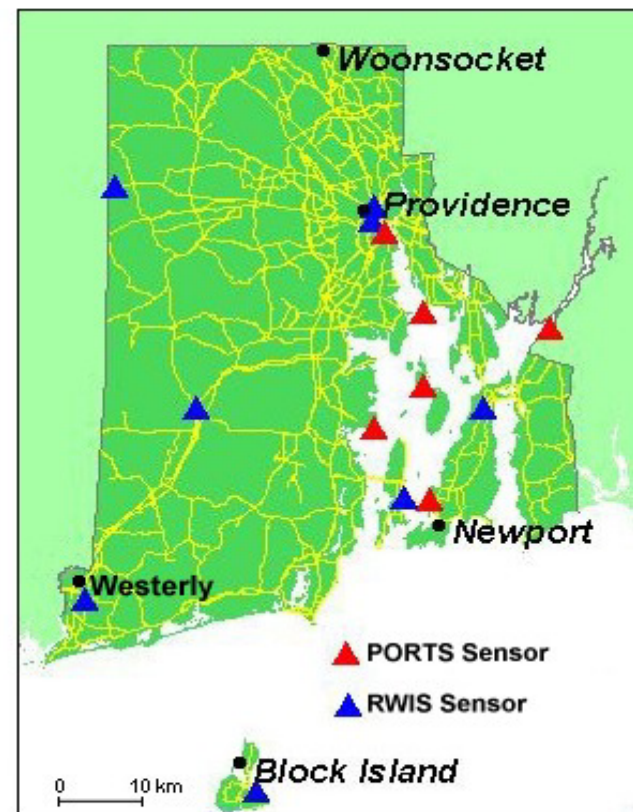
Newport

[View Data on a Map](#)

Current Conditions

20:00 (GMT)

Air Temp:	21.70 C
Wind Speed:	2.52 m/s
Wind Direction:	337.98
Pressure:	1015.9 mbar



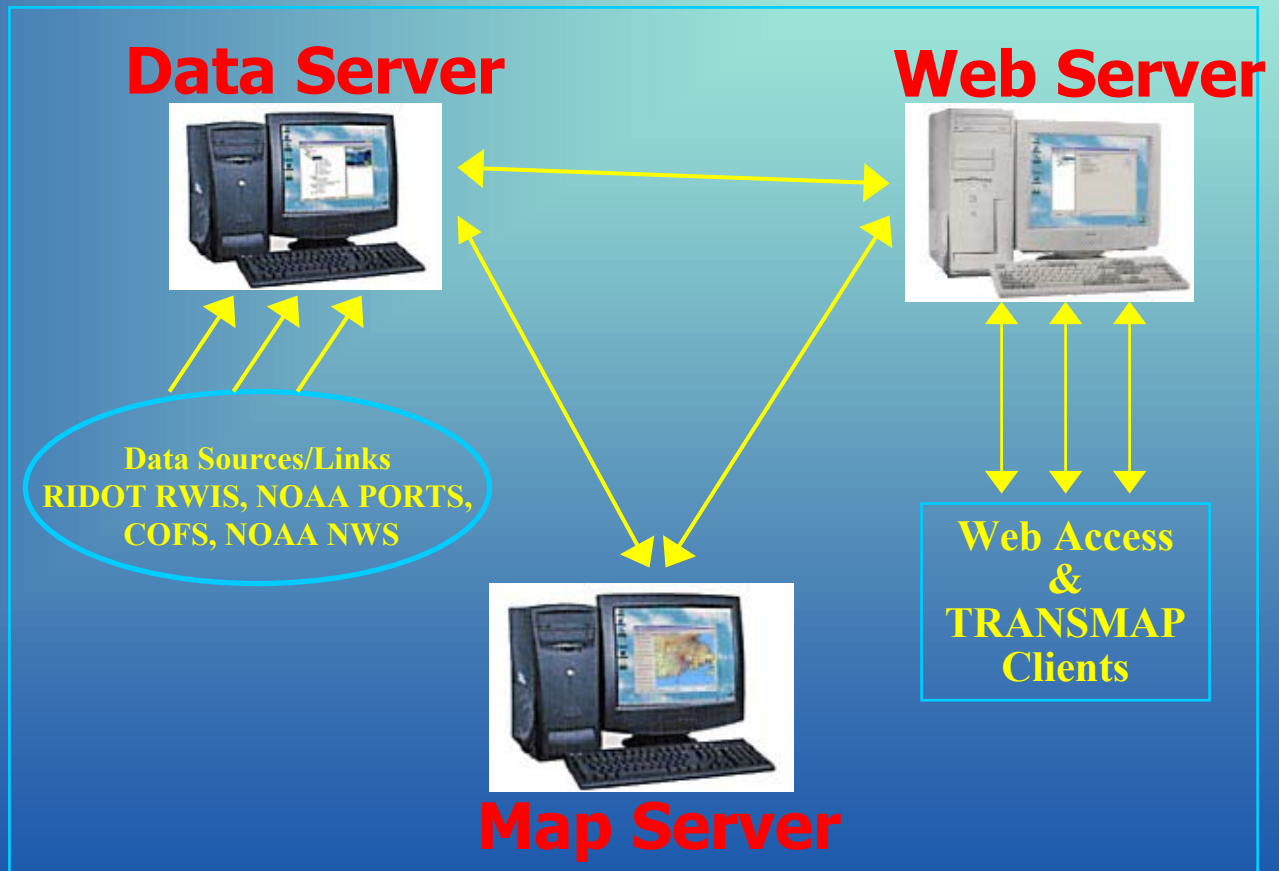
URI Transportation Center
RI Department of Transportation
[Applied Science Associates, Inc.](#)



TRANSMAP

INTERNET SERVER ARCHITECTURE

**Flexible and
scalable
architecture
allows
limitless
configurations
of the
TRANSMAP
Internet
Server
System.**



TRANSMAP

- Host Web Server
- Data Servers
 - Local Data Server
 - NOAA PORTS **Data Source Coverage Sites**
 - Narragansett Bay, RI
 - Conimicut Light, RI**
 - Fall River, MA (Site 1)
 - Fall River, MA (Site 2)
 - Newport, RI
 - Providence, RI
 - Prudence Island, RI
 - Quonset Point, RI
 - RIDOT **Data Source Coverage Sites**
 - Rhode Island RWIS
 - Block Island, RI
 - Route 95 & Providence Civ
 - Routes 46 and 95
 - Route 24 & Main, Middleto
 - Newport Bridge, Jamestow
 - Routes 78 & 91, Westerly
 - Route 101/Jerimoth Hill
 - Routes 95 & 102
 - NOAA COFS **Data Source Coverage Sites**
 - US East Coast
 - URI-GSO/NBC Monitoring System **Data Source Coverage Sites**
 - Narragansett Bay, RI
 - Bullock Reach Site
 - Phillipsdale Site (Seekonk I
 - Ponham Rocks
 - Prudence Island (North)
 - Prudence Island (South)

Site: Conimicut Light, RI

Sensors

- CTD Sensor
- Water Level Sensor
- Meteorological Sensor

Channels:

- Salinity (PSU)
- Water Temperature (c)
- Pressure (Decibars)

Status

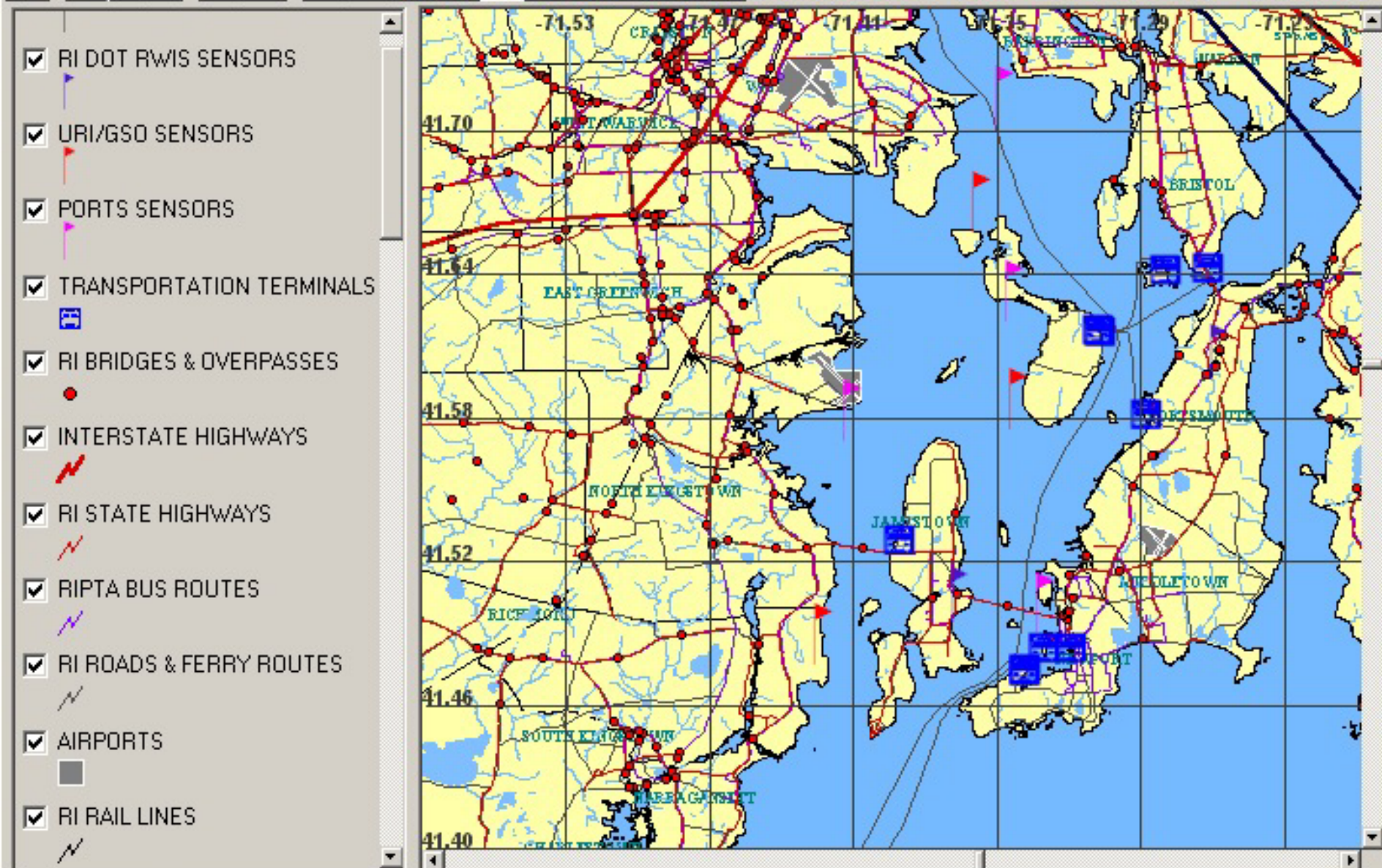
Channels

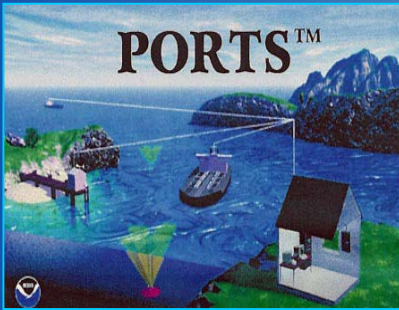
Status: Offline, Not Connected

TRANSMAP DATA SERVER



TRANSMAP MAP SERVER



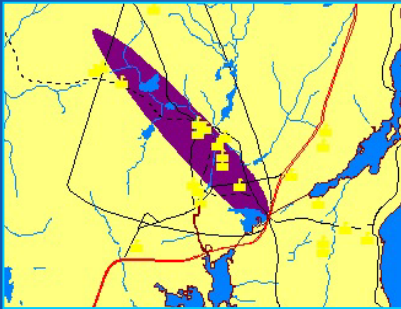


TRANSMAP

DATA PRODUCTS

**TRANSMAP
RETRIEVES
AND
ARCHIVES
DATA
FROM A
VARIETY
OF
SOURCES.**

- **NOAA PHYSICAL OCEANOGRAPHIC REAL TIME SYSTEMS.**
- **NOAA/NWS COASTAL OCEAN FORECASTING SYSTEM**
- **RI DOT ROAD WEATHER INFORMATION SYSTEM**
- **NOAA TROPICAL STORM SURGE MODEL**
- **URI GRADUATE SCHOOL OF OCEANOGRAPHY/NARRAGANSETT BAY COMMISSION BUOY SYSTEMS**
- **RI, MA, CT GEOGRAPHIC INFORMATION SYSTEMS**

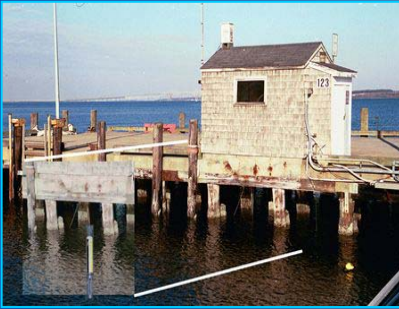


TRANSMAP

MODEL PRODUCTS

**TRANSMAP
INTEGRATES
DATA, MODEL
AND GIS
INFORMATION
TO PROVIDE A
UNIQUELY
INTEGRATED
AND
INTERACTIVE
MONITORING
AND
MANAGEMENT
SYSTEM.**

- **2D/3D HYDRODYNAMIC MODEL**
 - MARINE TRANSPORTATION, PARTICLE TRANSPORT & WATER QUALITY ANALYSIS
- **PARTICLE TRANSPORT MODEL**
 - SEARCH AND RESCUE, PARTICLE TRANSPORT & CHEMICAL CONTAMINANT RELEASES
- **HARMONIC CONSTITUENT ANALYSIS**
 - TIDAL FORECASTING
- **ROADWAY CONDITION PREDICTION MODEL**
 - WEATHER & ROADWAY CONDITION FORECASTS
- **EPA ALOHA MODEL**
 - AERIAL LOCATION OF HAZARDOUS ATMOSPHERES



TRANSMAP

PROJECT SUMMARY

**TRANSMAP
REPRESENTS A
UNIQUE REAL
TIME, INTEGRATED
ENVIRONMENTAL
MONITORING AND
FORECASTING
SYSTEM FOR LAND
AND MARINE
TRANSPORTATION.**

- **ACCESS TO GLOBAL AND OCEAN BASIN FORECASTING MODEL PRODUCTS IMPROVES FORECASTING ABILITY OF COASTAL MODEL PREDICTIONS.**
- **TRANSMAP STRENGTHENS THE OPERATIONAL RI ROAD WEATHER INFORMATION SYSTEM WITH THE ADDITION OF ROAD WEATHER MODEL FORECASTING FUNCTIONALITY.**
- **SELECTED DATA & MODEL PRODUCTS WILL BE AVAILABLE TO THE PUBLIC AND TRANSPORTATION USER GROUPS VIA THE INTERNET.**



TRANSMAP

PROJECT SUMMARY

**TRANSMAP
REPRESENTS A
UNIQUE REAL
TIME, INTEGRATED
ENVIRONMENTAL
MONITORING AND
FORECASTING
SYSTEM FOR LAND
AND MARINE
TRANSPORTATION.**

- **MODEL AND DATA PRODUCTS PROVIDED TO VESSEL OPERATORS AND PILOTS ASSISTS IN SAFE TRANSPORT OF PEOPLE AND BULK AND CONTAINERIZED CARGO.**
- **INCREASED SPATIAL RESOLUTION OF WEATHER AND ENVIRONMENTAL DATA THROUGH ACCESS TO ADDITIONAL MONITORING SYSTEMS IMPROVES MODEL FORECASTING CAPABILITIES.**
- **THE SYSTEM CAN READILY BE TRANSFERRED TO ANY OTHER LOCATION IN THE U.S. OR THE WORLD.**